



Know Your Options

*A Prostate Cancer
Education Program*

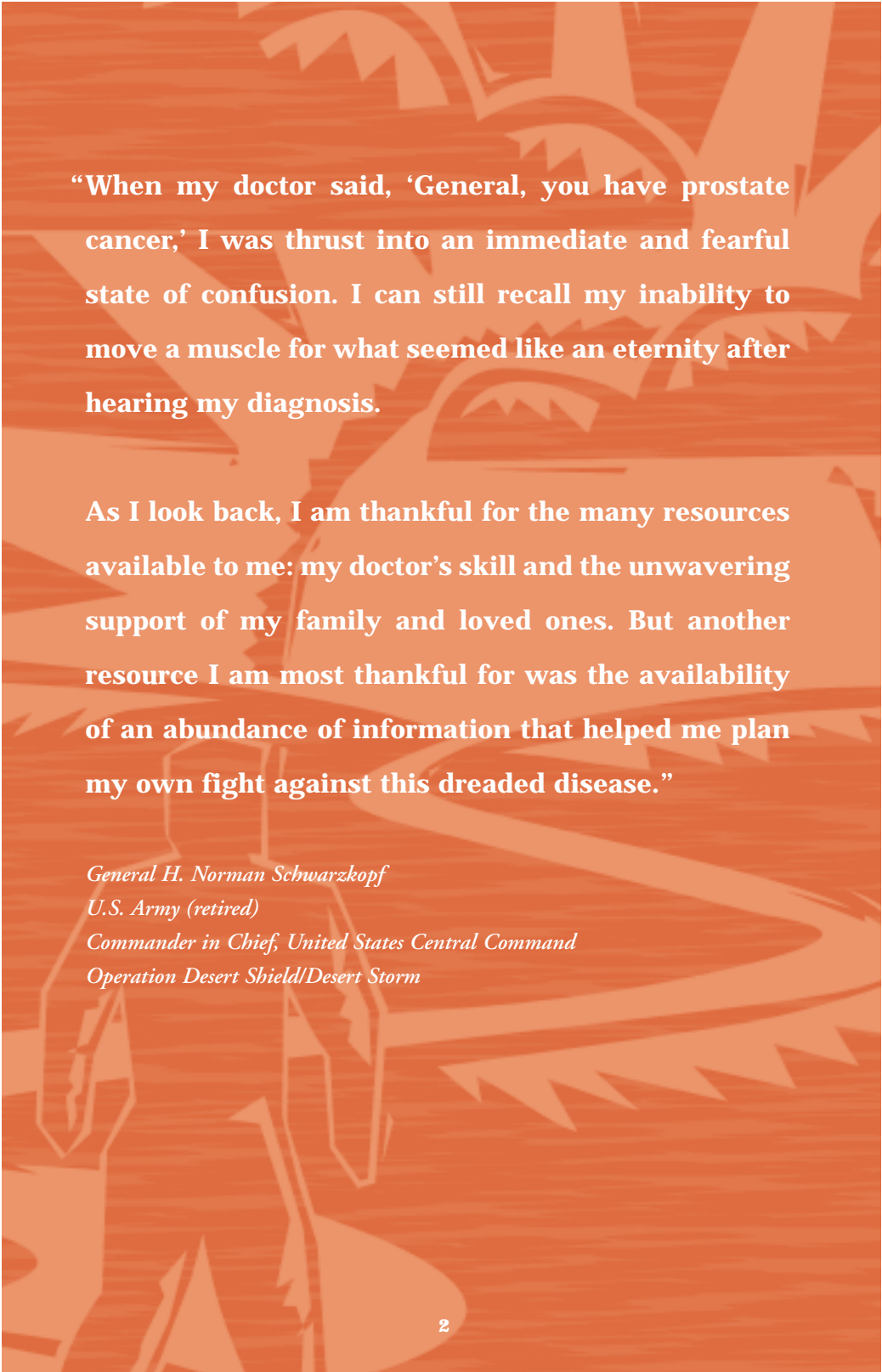
Understanding Treatment Choices for Prostate Cancer

*US TOO International, Inc.
National Cancer Institute*



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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“When my doctor said, ‘General, you have prostate cancer,’ I was thrust into an immediate and fearful state of confusion. I can still recall my inability to move a muscle for what seemed like an eternity after hearing my diagnosis.

As I look back, I am thankful for the many resources available to me: my doctor’s skill and the unwavering support of my family and loved ones. But another resource I am most thankful for was the availability of an abundance of information that helped me plan my own fight against this dreaded disease.”

General H. Norman Schwarzkopf

U.S. Army (retired)

Commander in Chief, United States Central Command

Operation Desert Shield/Desert Storm

Foreword

This year in the United States, almost 180,000 men will be told that they have prostate cancer.

After a diagnosis of prostate cancer, a man and his family face several choices regarding treatment. Decisions involve many factors, personal as well as medical. Before making these decisions, it is very important that he learns about all the options available.

This booklet can help a man and his family understand what a diagnosis of prostate cancer means and what treatment choices are offered. It suggests questions to ask the doctor and identifies other resources for more information. To help you understand the meaning of the words you will hear used to describe your cancer, medical terms are printed in **bold type** and are explained in the **Glossary** section at the back of this booklet.

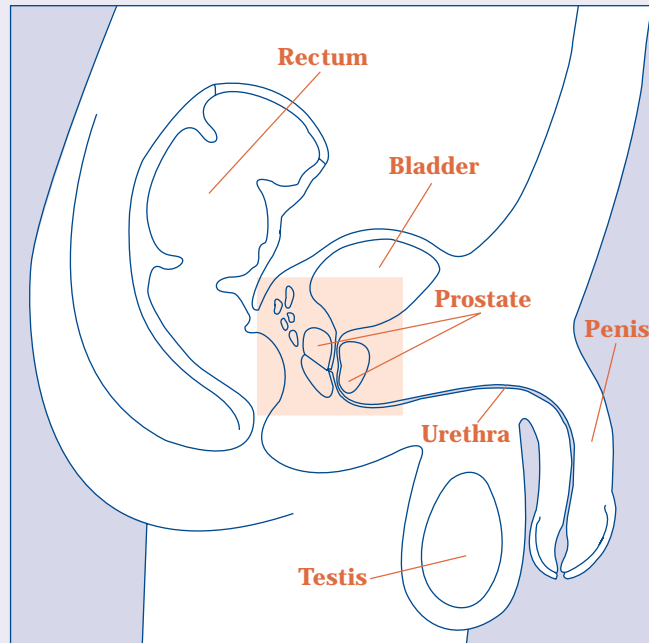
With this knowledge, a newly diagnosed prostate cancer patient can participate more confidently with his doctor in planning his individual treatment.

Introduction

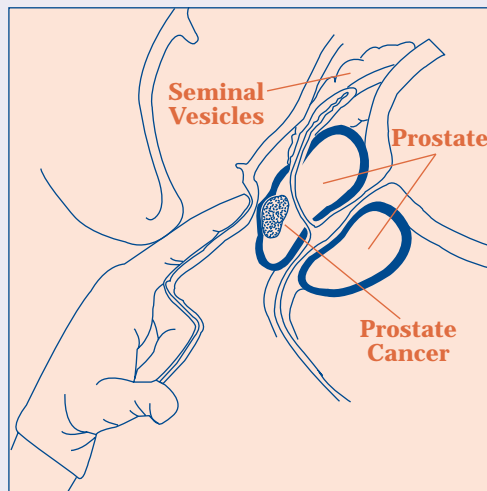
Prostate **cancer** is common in older men. By age 50, about one-third of American men have **microscopic** signs of prostate cancer. By age 75, half to three-quarters of men will have some cancerous changes in their **prostate glands**. Most of these cancers remain **latent**, producing no signs of symptoms, or are so **indolent**, or slow-growing, that they never become a serious threat to health.

A much smaller number of men will actually be treated for prostate cancer. About 16 percent of American men will be diagnosed with prostate cancer during their lives; 8 percent will develop significant symptoms; and 3 percent will die of the disease.

Until the last several years, prostate cancer death rates had been rising steadily. For example, this cancer in 1932 killed 17 of every 100,000 American men. By 1991, this number had reached 25 in 100,000. Since then, however, the death rates have been declining. The reasons for both the earlier increase and the recent decline in the prostate cancer death rates are unclear.



Digital Rectal Exam



What Is the Prostate Gland?

The prostate gland, a key part of the male reproductive system, is linked closely with the **urinary system**. It is a small gland that secretes much of the liquid portion of **semen**, the milky fluid that transports **sperm** through the **penis** during **ejaculation**.

The prostate is located just beneath the **bladder**, where urine is stored, and in front of the **rectum**. It encircles, like a donut, a section of the **urethra**. The urethra is the tube that carries **urine** from the bladder out through the penis. During ejaculation, semen is secreted by the prostate through small pores of the urethra's walls.

The prostate is made up of three lobes encased in an outer covering, or **capsule**. It is flanked on either side by the **seminal vesicles**, a pair of pouch-like glands that contribute secretions to the semen. Next to the seminal vesicles run the two **vas deferens**, tubes that carry sperm from the testicles. The **testicles**, in addition to manufacturing sperm, produce **testosterone**, a male sex **hormone** that controls the prostate's growth and function.

Is It Prostate Cancer?

Compared with most cancers, cancer of the prostate tends to grow slowly. Decades may pass from the time the earliest cell changes can be detected under a microscope until the cancer progresses enough to cause symptoms.

Like other cancers, prostate cancer can be diagnosed only by examining tissue under the microscope. When your doctor suspects prostate cancer—on the basis of your **symptoms**, or the results of a **digital rectal exam (DRE)**, and/or a **prostate-specific antigen (PSA)** test—the diagnosis must be made by doing a **biopsy**.

BIOPSY

To get a biopsy, you will go to a **urologist** and the procedure will be performed in the doctor's office. Using a **transrectal ultrasound (TRUS)** probe, the doctor first **images** your prostate, then inserts hollow biopsy needles into areas of the gland that feel or look suspicious. Bits of tissue are removed from each site through the needles; each snip causes a sharp sting. If a tissue sample is taken because of an elevated PSA test rather than a suspected abnormal

area in the prostate gland, random tissue samples are often taken from six or more sectors of the prostate. In a so-called **pattern biopsy**, tissue samples are obtained from half a dozen or more carefully spaced sectors of your prostate gland; this helps establish the size and extent of any cancer. However, even when multiple samples are taken, biopsy can miss some cancers.

Your biopsy tissue samples are then examined by a **pathologist**, a doctor who studies and identifies the cell and tissue changes produced by disease.

GRADING THE CANCER

Healthy prostate cells are uniform in size and shape, neatly arranged in the patterns of a normal gland. As cancer grows, they lose their healthy look. They change from normal, **well-differentiated** tissues to more disorganized, poorly differentiated tissue. Eventually, a **tumor** develops.

If your biopsy shows the presence of prostate cancer, the pathologist assigns each tissue sample a **grade**, indicating how far the cells have traveled along the path from normal to abnormal. The grade offers a good clue to your tumor's behavior: a tumor with a low grade

is likely to be slow-growing, while one with a high grade is more likely to grow **aggressively** or already to have spread outside the prostate (**metastasized**). The most widely used grading method for prostate cancer is known as the **Gleason grading system** (see *Gleason Scores*, page 7).

Tumor grade is useful as a predictor of outcome. In one analysis, 10 years after **prostatectomy** for **localized** cancer, prostate cancer had claimed the lives of 6 percent of the men whose cancers were well-differentiated compared with 20 percent of those with moderately differentiated cancers and 23 percent of those with poorly differentiated cancers. The chances of developing **metastatic** prostate cancer followed a similar pattern. Ten years after surgery, **metastases** had been diagnosed in 13 percent of the men with well-differentiated tumors, but in 32 percent of those with cancers that were moderately differentiated and 48 percent of those whose cancers were poorly differentiated.

STAGING THE CANCER

Once your cancer has been identified, the doctor wants to know how large it is and how far it has spread.

Gleason Scores

The Gleason grading system assigns a grade to each of the two largest areas of cancer in the tissue samples. Grades range from 1 to 5, with 1 being the least aggressive and 5 the most aggressive. Grade 3 tumors, for example, seldom have metastases, but metastases are common with grade 4 or grade 5.

The two grades are then added together to produce a **Gleason score**. A score of 2 to 4 is considered low grade; 5 through 7, intermediate grade; and 8 through 10, high grade. A tumor with a low Gleason score typically grows slowly enough that it may not pose a significant threat to the patient in his lifetime.

Depending on its size and spread, your doctor will **stage** your tumor. Information on your tumor stage, along with tumor grade and **PSA level**, is central to choosing your treatment and to monitoring its success.

Tumor stages are:

Localized

Stage I or A or T1: a tumor that cannot be felt (**nonpalpable**).

Stage II or B or T2: a tumor that can be felt (**palpable**) but is confined to the prostate gland.

Regional

Stage III or C or T3: a tumor that has grown through the prostate capsule, perhaps into the seminal vesicles.

T4: a tumor that has grown into nearby muscles and organs.

Metastatic

Stage IV or D and N+ or M+: tumors that have metastasized to the **regional (pelvic) lymph nodes** (N+) or more distant parts of the body (M+).

Staging Systems

One of two widely used staging systems, known as **TNM**, evaluates **T**umor size and spread, cancer in the nearby lymph **N**odes, and whether the cancer has established distant **M**etastases. The second system measures the same tumor characteristics, but uses an **ABCD** rating.

Each of these stages is subdivided into more precise categories (see *Staging Systems*, above).

In 1990, two-thirds of newly diagnosed prostate cancers were Stage I or II (clinically localized). Slightly more than 10 percent were Stage III (regional), while about 20 percent were Stage IV (metastatic).

The main tests used for clinical **staging** of prostate cancer are DRE, PSA, and transrectal ultrasound (TRUS). **Bone scans** may be used when distant metastases are suspected.

The digital rectal exam (DRE), a procedure in which the doctor inserts a gloved finger into the rectum to examine the rectum and prostate to look for an irregular or abnormally firm area, helps to gauge tumor size, and it may show if the cancer has spread into nearby tissues.

PSA tests are playing an increasingly common role in cancer staging. Elevated PSA levels in the blood correlate roughly with the volume of cancer in the prostate, with the stage and grade of the tumor, and with the presence or absence of cancer metastases or growths in other tissues. (For more about PSA, see *Resources* section, page 30, to order a copy of *Understanding Prostate Changes: A Health Guide for All Men*.)

Valuable information about tumor size and location can also be obtained from TRUS used to guide the biopsy in sampling abnormal areas of the prostate. TRUS uses an **ultrasound** probe inserted in the rectum to visualize the area on a screen.

The pathologist's evaluation of the biopsy samples also helps to establish the **clinical stage** (size and extent) of a cancer. The pathologist

tallies how many of the tissue samples contain cancer, notes whether any of the samples are more than half cancerous, and determines a Gleason score.

When clinical staging suggests that cancer has spread to the lymph nodes or beyond, **radionuclide** bone scans can be used to look for metastases to bone, a common site of prostate cancer spread. However, research now shows that patients with PSA levels of 10 ng/ml or less, without bone pain, are so unlikely to have bone metastases—regardless of tumor stage or grade—that doc-

tors often recommend that these patients can skip the bone scan.

Sophisticated **imaging techniques** such as **computed tomography (CT)** and **magnetic resonance imaging (MRI)** can also help to uncover distant metastases. Like bone scans, however, such tests may be unnecessary for some men. Recent studies indicate that when prostate cancer is clinically localized—the situation for two-thirds of newly diagnosed cases—CT and MRI add little to the information available through DRE, PSA, and TRUS.

Toward Better Testing

The higher a man's PSA level, the more likely that cancer could be in the picture. During screenings in men ages 50 or older, 85 of every 100 men will have normal PSA levels (4 ng/ml or below). Among the remaining 15 men, only 3 will have biopsies that show cancer.

*Some recent refinements designed to make PSA testing more accurate and more precise are under clinical study. For instance, **PSA density** relates a man's PSA level to the size of his prostate, which can be estimated through ultrasound. **PSA velocity** is based on changes in PSA levels over time; a sharp rise from a baseline level raises the suspicion of cancer.*

LYMPH NODES

When cancer occurs in the prostate, the gland's cells multiply abnormally and may eventually grow through the prostate capsule and invade nearby tissue. It may also spread to the lymph nodes of the **pelvis**, or it may spread throughout the body via the **lymphatic system** or the bloodstream.

Carefully removing and examining the lymph nodes—**pelvic lymph node dissection**—has traditionally been the final check to see if cancer has spread. It may be through “open” **surgery** or via **laparoscopy**, using a **fiberoptic probe** inserted through a small **incision** in the **abdomen**. When PSA level, tumor grade, and stage are evaluated, doctors may choose to bypass pelvic lymph node dissection. However, such clinical decisions may be revised to take into account new findings after surgery (prostatectomy). **Pathologic staging** judges tissues removed at prostatectomy. The pathologist looks for cancer in outer areas of the gland and at the **surgical margins**—the outermost cut edges of the surgical specimen.

SECOND OPINIONS

Once you receive your doctor's opinion about what treatments you need, it may be helpful to get more advice before you make up your mind. Other doctors' opinions can help you make one of the most important decisions of your life. Getting another doctor's advice is normal medical practice, and your doctor can help you with this effort. Many health insurance companies require and will pay for other opinions. Another opinion can help you:

- *Confirm or adjust your treatment plan based on the diagnosis and stage of the disease.*
- *Get answers to your questions and concerns and help you become comfortable with your decisions.*
- *Decide about taking part in clinical trials of new prostate cancer treatment methods.*

(See *Clinical Trials*, page 20.)

You may also consider contacting a prostate cancer **support group** in your area. Talking with other men who have experienced the various procedures available may help you to understand better the treatment options described by your doctor.

Making Treatment Choices

If you have been diagnosed with prostate cancer, you may be overwhelmed with an array of treatment options. Your course of action will, to some extent, be influenced by the character of your cancer. Your decisions should also reflect your personal priorities after weighing each potential benefit and possible harm for the treatment options available. Your age and health should also be considered.

Treatment decisions are complicated by shortcomings in both **prognosis** and treatment. Although your Gleason score and PSA level provide good guidelines, there is still no way to know for sure how rapidly your prostate cancer will progress. Nor are there any results available from clinical trials that directly compared different types of treatment for similar stages of disease to help you evaluate possible options.

Questions to Consider

Many questions will need answers.

- *Is your cancer truly confined to the prostate gland, or has it spread to nearby—or even distant—parts of your body?*
- *Is it aggressive or slow-growing?*
- *What is your general health status?*
- *Are you young enough so that even a slow-growing cancer might someday pose a threat?*
- *Are you healthy enough for surgery?*
- *Are you willing to risk serious, lifelong side effects to possibly reduce your chances of a cancer death?*
- *How important is it for you, in your work or recreation, to maintain bladder or bowel control?*
- *How important is it to be able to have erections?*
- *Or would you find it too worrisome to live with an untreated cancer, too stressful to face frequent monitoring?*

Treatment Options for Localized Disease

If your prostate cancer is confined to the gland, or localized (Stage I or II/low Gleason score), you are a good candidate for treatments that can result in long-term survival. There are three main approaches to managing localized cancer: **watchful waiting**, surgery, and **radiation therapy**.

WATCHFUL WAITING

Watchful waiting is based on the premise that cases of localized prostate cancers may advance so slowly that they are unlikely to cause men—especially older men—any problems during their lifetimes. Some men who opt for watchful waiting, also known as “**observation**” or “**surveillance**,” have no active treatment unless symptoms appear. They are often asked to schedule regular medical checkups and to report any new symptoms to the doctor immediately.

Watchful waiting has the obvious advantage of sparing a man with clinically localized cancer—who typically has no symptoms—the pain and possible **side effects** of surgery or radiation. On the minus

side, watchful waiting risks decreasing the chance to control disease before it spreads, or postponing treatment to an age when it may be more difficult to tolerate. Of course, treatments may also improve over time if watchful waiting is chosen. Another potential disadvantage is anxiety; some men don’t want the worry of living with an untreated cancer.

The most obvious candidates for watchful waiting are older men whose tumors are small and slow-growing, as judged by low grade/Gleason score and low stage.

Many men who choose watchful waiting live for years with no signs of disease. A number of studies have found that, for at least 10 or even 15 years, the life expectancy of men treated with watchful waiting (primarily older men with less lethal forms of prostate cancer) is not substantially different from the life expectancy of men treated with surgery or radiation—or, for that matter, of the population at large.

SURGERY

In the early 1990s, roughly 30 percent of prostate cancer patients in the United States were treated by surgery, 30 percent by radiation,

“Conservative management (watchful waiting) of localized prostatic cancer is difficult for the physician to advise and the patient to accept, in part because both public and physician education (in the United States) have been focused on early diagnosis and cure and because of the powerful emotional impact provided by cancer mortality.”

—*Willet Whitmore, M.D., Emeritus*
Memorial Sloan-Kettering Cancer Center, New York

and 20 percent by watchful waiting. (Most of the rest were treated with a combination of therapies.) In Europe, by contrast, watchful waiting constitutes the standard treatment for **asymptomatic** prostate cancer.

The popularity of surgery in this country has grown tremendously in recent years. A study of Medicare patients' records found that the number of men nationwide receiving **radical prostatectomy** by 1990 was six times greater than the number recorded for 1984, and the increase was seen in all age groups, from the youngest (that is, age 65) to men in their eighties. Recent

statistics, however, indicate that since 1993, the rate of prostatectomies has been dropping.

The procedure

An operation called radical prostatectomy completely removes the prostate and nearby tissues. A radical prostatectomy is further described in terms of the incisions used by the surgeon to reach the gland. In a **retropubic prostatectomy**, the prostate is reached through an incision in the lower abdomen; in a **perineal prostatectomy**, the approach is through the **perineum**, the space between the **scrotum** and the **anus**. In radical

prostatectomy, the surgeon excises the entire prostate gland, along with both seminal vesicles, both **ampullae** (the enlarged lower sections of the vas deferens), and other surrounding tissues. The section of urethra that runs through the prostate is cut away (and with it some of the **sphincter** muscle that controls the flow of urine).

Pelvic lymph node dissection is done routinely as part of a retropubic prostatectomy; with a perineal prostatectomy, lymph node dissection requires a separate incision.

Possible problems

Radical prostatectomy is a complicated and demanding procedure that typically requires **general anesthesia** and takes 2 to 4 hours. Patients stay in the hospital for about 3 days, and need to wear a tube to drain urine (**catheter**) for 10 days to 3 weeks. About 5 to 10 percent of patients experience surgery-related complications such as bleeding, infection, or **cardio-pulmonary** problems. There is a small risk of death from surgery; it is less for men who are young and healthy than men who are older and frail.

Prostatectomy also carries the risk of serious long-term problems, notably urinary **incontinence**, **stool incontinence**, and sexual **impotence**. (The procedure also makes it very unlikely for a man to father children, since little ejaculate is produced without the prostate.)

Most men experience urinary incontinence following surgery. Many continue to have intermittent problems with dribbling caused by coughing or exertion. A few men permanently lose all urinary control. Some men can be helped with an artificial urinary sphincter, surgically implanted, or with injections of collagen to narrow the bladder opening.

Infrequently men may develop stool or **fecal incontinence** after radical prostatectomy. Fecal incontinence is the loss of normal muscle control of the bowels. Muscle damage can occur during rectal surgery. Stool incontinence may also be caused by a reduction in the elasticity of the rectum, which shortens the time between the sensation of the stool and the urgent need to have a bowel movement. Surgery or radiation injury can scar and stiffen the rectum.

At one time, prostatectomy almost invariably resulted in sexual impotence. Today, the risk of

impotence may be reduced by **nerve-sparing surgery**. This technique carefully avoids cutting or stretching two bundles of nerves and blood vessels that run closely along the surface of the prostate gland and are needed for an erection.

However, nerve-sparing surgery is not possible for everyone. Sometimes the cancer is too large or is located too close to the nerves. Even with nerve-sparing surgery, many men—especially older men—become impotent. Most men will lose a degree of sexual

function. (If a man has trouble with erections prior to treatment, nerve-sparing surgery is probably not indicated.) Depending on age, extent of disease, and type of surgery, the chances of impotence vary widely—somewhere between 20 and 90 percent.

RADIATION THERAPY

Radiation therapy uses high-energy **x-rays**, either beamed from a machine or emitted by **radioactive seeds** implanted in the prostate, to kill cancer cells. When prostate cancer is

A Survey of Prostate Cancer Patients

Half were between ages 65 and 70 years old at the time of prostatectomy, half were age 70 or older.

Two-thirds reported problems with urinary incontinence.

Nearly one-third used something like absorbent pads to cope with wetness.

About 60 percent were unable to have an erection firm enough for intercourse—even though almost all of them said that they had been able to have erections to at least some extent before surgery.

And one-fifth needed treatment to relieve urinary complications caused by scar tissue in the urethra. In the hands of the most experienced surgeons—and for younger men—some of these complications may be less common.

localized, radiation therapy serves as an alternative to surgery. **External beam radiation therapy** is also commonly used to treat men with regional disease, whose cancers have spread too widely in the pelvis to be removed surgically, but who have no evidence of spread to the lymph nodes. In men with advanced disease, radiation therapy can help to shrink tumors and relieve pain.



External beam radiation therapy

External beam radiation therapy generally involves treatments 5 days a week for 6 or 7 weeks. The treatments cause no pain, and each session lasts just a few minutes. In many cases, if the tumor is large, **hormonal therapy** may be started at the time of radiation therapy and continued for several years. (See page 19.)

The primary target is the prostate gland itself. In addition, the seminal vesicles may be irradiated (since they are a relatively common site of cancer spread). Radiating the lymph nodes in the pelvis, once common practice, has not proven to produce any long-term benefits for most patients, but it may be necessary in certain circumstances.

Possible problems

Because the radiation beam passes through normal tissues—the rectum, the bladder, the intestines—on its way to the prostate, it kills some healthy cells. Radiation to the rectum often causes diarrhea, but the diarrhea—as well as radiation-induced fatigue—usually clears up when treatment is over.

Radiation can also cause a variety of long-term problems. These include **proctitis**, inflammation of the rectum, with bleeding and bowel problems such as diarrhea, and **cystitis**, inflammation of the bladder, leading to problems with urination. In addition, some 40 to 50 percent of men treated with radiation therapy become impotent.

With newer techniques, available at state-of-the-art radiation

therapy centers, side effects may be fewer. Higher-energy radiation beams can be more precisely focused, while computer technology allows a **radiation oncologist** to tailor treatment to the anatomy of the individual patient.

Internal radiation therapy

Radiation can also be delivered to the prostate from dozens of tiny radioactive seeds implanted directly into the prostate gland. This approach, known as **interstitial implantation** or **brachytherapy**, has the advantage of delivering a high dose of radiation to tissues in the immediate area, while minimizing damage to healthy tissues such as the rectum and bladder.

As practiced today, internal radiation therapy relies on ultrasound or CT to guide the placement of thin-walled needles through

the skin of the perineum. Seeds made of **radioactive palladium** or **iodine** are delivered through the needles into the prostate, according to a customized pattern—using sophisticated computer programs—to conform to the shape and size of each man’s prostate.

The implantation procedure can be completed in an hour or two under local anesthesia; the patient typically goes home the same day.

The seeds emit radiation for several weeks, then remain permanently and harmlessly in place. Alternatively, some doctors use much more powerful radioactive seeds over a period of several days. Such temporary implants, which require hospitalization, may be combined with low doses of external beam radiation.

Because the experience with modern internal radiation therapy

The men most likely to do well after external beam radiation therapy are the same as those most likely to do well after radical prostatectomy or watchful waiting: They have well-differentiated Stage I or Stage II tumors.

techniques is relatively recent and limited to carefully selected patients, long-term results are not yet known. At 5 years, more than 90 percent of patients remain free of disease.

Internal radiation therapy is not well suited for large or advanced tumors, or for men previously treated with **transurethral resection of the prostate (TURP)** for **benign prostatic hyperplasia (BPH)**, who run an increased risk for urinary complications. For men with small, well-differentiated tumors, it may provide an option that is less **invasive**, has fewer side

effects, takes less time to do, requires less time in the hospital, and is less costly than either external radiation or surgery.

Possible problems

Post-implant discomfort can usually be controlled by oral painkillers. The man can expect a few weeks of incontinence, but long-term complications such as **prostatitis** or urinary incontinence are uncommon and generally not severe. Sexual impotence occurs in about 15 percent of men under age 70 and 30 to 35 percent of men over age 70.



Treatment Options for Disease That Has Spread

If your cancer has grown beyond the prostate gland (Stage III), it cannot be stopped with local therapies—although radiation therapy can help to keep the tumor in check and hormonal therapy may slow its advance. If your prostate cancer is metastatic (Stage IV), it is usually treated with hormonal therapy, which can relieve painful or distressing symptoms and slow the progress of disease. Another option for metastatic disease is to enter clinical trials and accept new treatments that are being studied.

HORMONAL THERAPY

Hormonal therapy combats prostate cancer by cutting off the supply of male hormones (**androgens**) such as testosterone that encourage prostate cancer growth. Hormonal control can be achieved by surgery to remove the testicles (the main source of testosterone) or by drugs.

Hormonal therapy targets cancer that has spread beyond the prostate gland and is thus beyond the reach of local treatments such as surgery or radiation therapy. Hormonal therapy is also helpful in

alleviating the painful and distressing symptoms of advanced disease. Further, it is being investigated as a way to arrest cancer before it has a chance to metastasize (See *Clinical Trials* Web site <http://cancertrials.nci.nih.gov>). Although hormonal therapy cannot cure, it will usually shrink or halt the advance of disease, often for years.

Surgery to remove the testicles (**orchiectomy** or surgical **castration**) is usually an outpatient procedure. The testicles are removed through a small incision in the scrotum; the scrotum itself is left intact. To help offset the operation's psychological toll, some men opt for reconstructive surgery in which the surgeon replaces the testicles with **protheses** shaped like testicles.

A variety of hormonal drugs can produce a **medical castration** by cutting off supplies of male hormones. Female hormones (**estrogens**) block the release and activity of testosterone. **Antiandrogens** block the activity of any androgens circulating in the blood. Still another type of hormone, taken as periodic injections, prevents the brain from signaling the testicles to produce androgens.

Possible problems

Either surgical castration (orchiectomy) or medical castration (hormonal drug therapy) can produce a striking response. Both approaches cause tumors and lymph nodes to shrink and PSA levels to fall. However, both castration methods can cause hot flashes, impotence, and a loss of interest in sex. Medical castration by treatment with hormonal drug therapy can cause breast enlargement and can increase a man's risk of **cardiovascular problems**, including heart attacks and strokes.

Hormonal therapy has been tried in many combinations. One approach, known as **maximum androgen blockade** or complete hormonal therapy, combines castration (either surgical or medical) with an antiandrogen pill, taken daily, for months or years. However, studies show that single hormone treatments have similar effectiveness compared to maximum androgen blockade. Combining surgery with hormonal therapy appears to relieve symptoms.

Medical castration by hormonal therapy can be costly, but, unlike surgical castration, its effects can be reversed by stopping the drug. Moreover, halting hormone treatments will sometimes, paradox-

ically, temporarily interrupt the progress of an advanced and advancing cancer.

Unfortunately, hormonal therapy for metastatic disease works only for a limited time. **Remissions** typically last 2 to 3 years. Eventually, cancer cells that don't need testosterone begin to flourish, and cancer growth resumes. When that happens, a variety of other, second-line **hormonal-type drugs** (for example, hydrocortisone or progesterone) may be tried.

CLINICAL TRIALS

Many techniques are being tried in investigational studies. They have not been used in enough patients or for a long enough time to prove themselves better than conventional treatments.

Cryosurgery

Cryosurgery uses liquid nitrogen to freeze and kill prostate cancer cells. Guided by TRUS, the doctor places needles in preselected locations in the prostate gland. The needle tracks are dilated for the thin metal cryo probes to be inserted through the skin of the perineum into the prostate. Liquid nitrogen in the **cryo probes** forms an ice ball that freezes the prostate cancer cells; as

PSA and Outcomes

The first use of PSA tests was to gauge the success of treatment. After the prostate—the source of PSA—has been eliminated by surgery, PSA levels can be expected to fall. If PSA still can be detected, it suggests that some prostate cells still may be present somewhere in the body. If, sometime in the future, the PSA level begins to rise, it may be the first sign of **recurrence**. Such a **biochemical relapse** typically precedes **clinical relapse**—symptoms—by months or years. However, it is not known if treatment should start again or change based solely on a rise in PSA.

Now research suggests that **pretreatment PSA levels** may provide another important clue to prognosis, independent of stage and grade. In one study, nearly 90 percent of the men with a low pretreatment PSA level (4 ng/ml or less) remained free of any signs of relapse (either symptoms or a rising PSA level) 5 years after surgery. But among men with a high preoperative PSA level (20 ng/ml or higher), just one-quarter remained relapse-free.

the cells thaw, they rupture. The procedure takes about 2 hours, requires anesthesia (either general or spinal), and requires 1 or 2 days in the hospital.

During cryosurgery, a warming catheter inserted through the penis protects the urethra, and incontinence is seldom a problem. However, the overlying nerve bundles usually freeze, so most men become impotent.

Early hormonal therapy

Early or **neoadjuvant hormonal therapy** is started as soon as prostate cancer is diagnosed, in hopes of slowing the growth of cancer that has spread into nearby tissues or of cancer that has invaded the lymph nodes. Given prior to surgery, neoadjuvant hormonal therapy often helps to shrink a tumor.

Chemotherapy

Chemotherapy, which kills fast-growing cells, has not proven particularly effective against slow-growing prostate cancer cells. Several promising new anticancer drugs are under study, being added to either surgery or radiation therapy for men with Stage III prostate cancer. Chemotherapy is also being tried in conjunction with hormonal therapy for men whose advanced cancers are no longer responsive to hormonal therapy alone.

Conformal radiation therapy

A 3-dimensional **conformal radiation therapy (3D-CRT)** uses sophisticated computer software to conform or shape the distribution of radiation beams to the 3-dimensional shape of the diseased prostate, sparing damage to normal tissue in the vicinity of treatment.

COMPLEMENTARY THERAPIES

In addition to medical treatment, some cancer patients want to try complementary therapies. Complementary therapies include acupuncture, herbs, biofeedback, visualization, meditation, yoga, nutritional supplements, and vitamins. Some prostate cancer patients feel that they benefit from some of these therapies.

Before you try any of these therapies, you should discuss their possible value and side effects with your medical doctors. You should let them know if you are using any such therapies. Be aware that these therapies may be expensive, and some are not paid for by health insurance. As with any treatment, you should ask the therapist for evidence of how the therapy has helped others.



Considering Your Chances of Survival

Your chances of being alive, and disease-free, 10 or 15 years after diagnosis are apt to depend more on the stage and grade of your cancer than on the choice of treatment. The best outlook, as might be expected, is for patients with smaller, slow-growing, well-differentiated tumors. The good news is that approximately three-quarters of all newly diagnosed prostate cancers are clinically localized (Stage I or Stage II). About 15 percent are Stage III, and 11 percent are Stage IV.

STAGE I AND STAGE II

If your prostate cancer is limited to the prostate (Stages I or II) and it is well or moderately differentiated (Gleason score 7 or below), the 5-year outcome is considered excellent for all three treatment options: watchful waiting, surgery, or radiation therapy. Even at the end of 10 years, few men with Stage I or II and a low Gleason score will have succumbed to prostate cancer.

With a median age of 72 at diagnosis, many men with prostate cancer die of a variety of other natural causes in the next 10 to 15

years. Few men with low-grade localized disease die of prostate cancer. The **disease-specific survival rate**—which excludes deaths from other causes—is close to 90 percent. In other words, regardless of treatment—watchful waiting, surgery, or radiation therapy—such a man can consider his cancer a chronic disease because he is much more likely to die of other causes than of prostate cancer.

Men with localized tumors who opt for watchful waiting, if they live long enough, may run a greater risk of eventually developing metastatic disease. In one series of studies, the chance of developing metastases within 10 years was 19 percent for men with well-differentiated tumors and 42 percent for men with moderately differentiated tumors.

Only one small study has directly compared watchful waiting with radical prostatectomy, and it found no significant differences in survival. More reliable answers should be forthcoming from ongoing trials. In a 15-year study known as **PIVOT (Prostate Cancer Intervention versus Observation Trial)**, some 1,250 patients with clinically localized prostate cancer (Stage I or Stage II and low Gleason score) are being randomly assigned to either

watchful waiting or radical prostatectomy. Similar trials comparing watchful waiting to surgery or to radiation therapy are under way in Europe.

Surgery or radiation therapy is chosen typically by those men whose tumors, although apparently localized, are more extensive or poorly differentiated (Gleason score of 8 to 10). Without aggressive therapy, around three-quarters of such men will have developed metastatic disease in the following 10 years, and two-thirds will have died from prostate cancer. Whether or not treatment can change these outcomes is under study.

The reality is that not all seemingly localized cancers are, in fact, limited to the prostate gland. When examining excised biopsy tissue, pathologists find that as many as half show prostate cancer that has broken through the capsule, invaded the seminal vesicles, or spread into the surgical margins or lymph nodes. In other words, many cancers that are clinically Stage I or Stage II need to be reclassified as Stage III after the pathologist reports his findings. In other cases, even some cancers that are clinically staged and pathologically verified as Stage I or II apparently are still

capable of spreading, since up to one-fourth of these patients will experience the recurrence of prostate cancer over the next few years. A review of Medicare records from around the country found that more than one-third of the men initially treated with radical prostatectomy needed additional cancer treatment in the next 5 years.

STAGE III

If your prostate cancer is Stage III, it is a regionalized tumor that has spread beyond the prostate—through the capsule that encloses the prostate and perhaps into the seminal vesicles. However, it has not yet, as far as can be determined, reached the lymph nodes or any more distant sites in the body.

External beam radiation therapy is often used to treat Stage III cancers. Besides being less invasive than surgery, it is better suited for bulky tumors. A few men have surgery, while others rely on watchful waiting. Men whose tumors are reclassified as Stage III after surgery (because cancer is found to have spread through the capsule or into the lymph nodes) sometimes go on to have radiation therapy postoperatively. Studies are in progress to evaluate this approach.



Stage III tumors are often large enough to create difficulties with urination. These may be treated in a variety of ways, including radiation therapy, surgery, TURP, and hormonal therapy.

The long-term prospects for men with Stage III prostate cancer depend on the extent of disease. Once cancer has broken through the prostate capsule, chances that the disease will progress in the next 10 years are about 50-50. Spreading to the seminal vesicles further increases the likelihood of a recurrence. One study, following up on men who had been treated with radiation therapy 20 years earlier, found that close to half of them eventually died of prostate cancer, although nearly as many had died of some other cause with no sign of cancer recurrence.

STAGE IV

If your prostate cancer has spread to the nearby lymph nodes or to distant parts of the body, it is called metastatic prostate cancer. Hormonal therapy will generally improve symptoms and delay the progress of disease for another 2 to 3 years. If just the lymph nodes are involved, a man may use hormonal therapy to delay the progress of prostate cancer even longer. However, the vast majority of those with positive lymph nodes at the time of getting hormonal therapy will remain at risk of developing additional metastatic disease within 10 years after the treatment. Bone metastases tend to be less responsive to hormonal therapy.

Pain Management

Over time, metastatic prostate cancer often stops responding to hormonal therapy. Advancing disease may be accompanied by painful symptoms, usually involving the urinary tract or bones, along with weakness, fatigue, and weight loss.

Doctors, including specialists in pain control, can offer a variety of ways to counteract such symptoms and help the patient achieve comfort. Radiation, with either external beam radiation therapy or periodic injections of bone-seeking radioactive chemicals (radionuclides), may ease pain caused by bone metastases, and it may also delay the progress of disease. Surgery can be helpful in opening a blocked urinary tract. Beneficial drugs include steroids and other “second-line” hormonal therapies, as well as pain-killers. When pain cannot be entirely eliminated, it can be effectively relieved in the majority of patients.

The Decision Is Yours

An important consideration to factor into your treatment decisions is that success is not guaranteed. As many as half of the apparently localized cancers turn out, at surgery, to have already spread. And up to one-fourth, despite apparently successful surgery, will produce a recurrence over the next several years. Thus, while aggressive treatment will be unnecessary for some men, it will prove inadequate for others.

In coming to a decision, you may find it helpful to thoroughly discuss your treatment options, including benefits and side effects, with your wife/partner. You may also consider contacting your local prostate cancer support group after consulting with your primary care physician and one or more specialists. Getting a second opinion and different perspectives can be very helpful.

Your decision does not need to be rushed. Take time to explore all your options. You may prefer a teaching hospital or a cancer center for treatment, choosing a surgeon or radiation oncologist who has extensive experience in the newest, least traumatizing techniques. You may

New Directions

Prostate cancer research is advancing on dozens of fronts. Scientists are probing the basic causes of disease, developing markers to distinguish slow-growing cancers from aggressive cancers, and testing drugs to control or reduce risk for prostate cancer. Most of the results are preliminary at present.

Genes and prostate cancer. Researchers are exploring numerous links between genes and the development of prostate cancer. They have identified several genes that may affect a prostate cancer's ability to spread (metastasize), a gene change spurred by hormonal therapy, and a gene flaw that interferes with the body's defenses against **environmental carcinogens**. The presence of multiple identical **genetic** segments (**DNA repeats**), which appear to intensify signals that order the cell to multiply, may provide a better way to predict a cancer's aggressiveness.

Control. Researchers are investigating the possibility that drugs might keep latent prostate cancers from developing into active cancers. In NCI's **Prostate Cancer Prevention Trial (PCPT)**, 18,000 healthy men age 55 and older are taking either finasteride (currently used to shrink the prostate in benign prostatic hyperplasia) or a **placebo** every day for 7 to 10 years. Smaller trials are testing **DFMO**, a drug that inactivates an **enzyme** that cells need in order to multiply, and **4-HPR**, a **vitamin A analog** that may block **hormone-responsive** tumors.

Reduce risk. Since prostate cancer is less common in populations with low-fat, high-fiber, high-soy diets, scientists are also looking into the possibility of using diet to prevent prostate cancer from developing. There is still no evidence to show that switching to a healthy diet after years of eating high-fat foods will make a difference, but small studies are testing the effects of a low-fat, high-soy diet among men who have an increased risk of prostate cancer and men who have already been treated for prostate cancer. There is some evidence of a lower **incidence** of prostate cancer in men who eat lots of tomato-based foods, especially tomato sauce cooked with a little olive oil.

want to take part in a clinical trial evaluating new approaches. You will also want to keep abreast of new developments, checking with sources such as NCI's Cancer Information Service (1-800-4-CANCER). Ultimately, the decision rests with each individual. Each man has his own priorities and knows best which choices feel most comfortable for him.

Questions To Ask Your Doctor

We hope that this booklet has answered many of your questions about your prostate cancer and treatment options. However, no booklet can take the place of talking directly with your health care professionals. If you don't understand the answers, ask them to explain further.

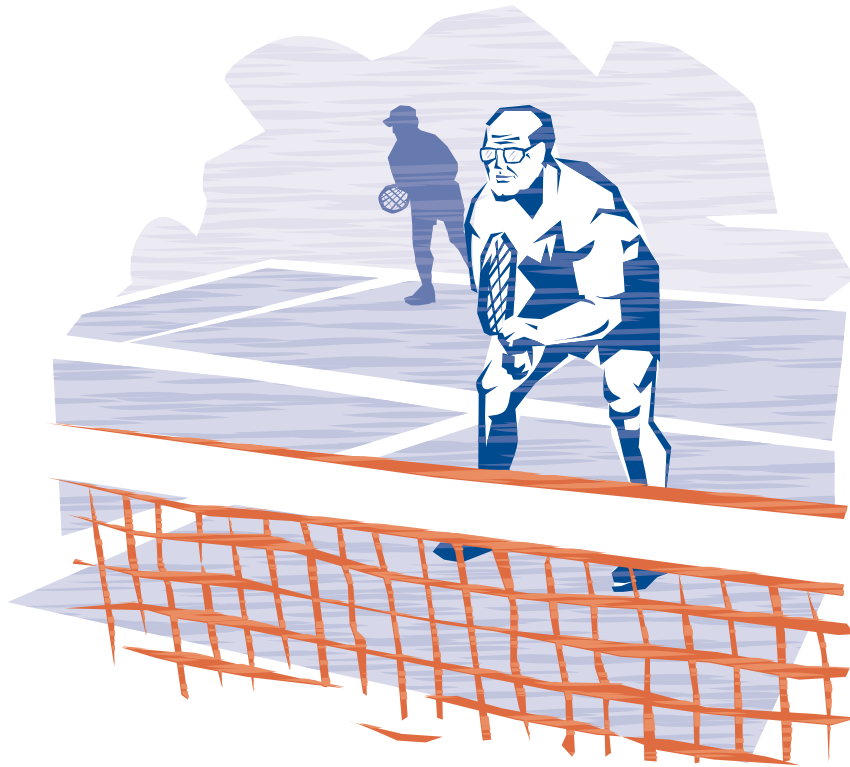
Many men find it helpful to write down their questions ahead of time. Below are some of the most common questions. You may have others. Jot them down as you think of them, and take the list with you when you see your doctor.

- *Could my symptoms be a sign of cancer?*
- *What tests do you recommend? Why?*
- *If I don't have cancer, what can I do about my symptoms?*
- *If I do have cancer, what stage is it? What grade? What is my PSA level?*
- *Would it be useful to get a second opinion from a second pathologist?*
- *What is my prognosis? Is recurrence likely?*
- *Do I need additional tests to look for lymph node involvement or metastases?*
- *What are my treatment options? What are the benefits?*
- *What are the possible side effects? How can they be managed?*
- *Are there clinical trials that would be appropriate for me?*
- *What other doctors should I talk with—a cancer specialist, a surgeon, a radiation oncologist?*
- *How much experience does the doctor have? How many times a year does he perform this procedure? If a surgeon, is he familiar with nerve-sparing techniques?*

Followup Care

Depending upon your choice of treatment for prostate cancer, your doctor will make some recommendations for followup care. These recommendations may include more tests, and the results will be used to make choices that should improve your quality of life as a prostate

cancer survivor. For example, you may be asked to have more PSA tests, bone scans, or **palliative treatment**. If you find any unusual changes in your body such as bone pain or swollen lymph nodes, you should call your doctor as soon as possible.



Resources

This booklet is a starting point to help you understand your prostate cancer diagnosis and treatment options. Your own doctors and nurses are the best sources for answers to your questions. As noted throughout this booklet, NCI's Cancer Information Service (CIS) can provide the latest cancer information and help you find prostate cancer support groups in your community.

The CIS is a nationwide information and education network for cancer patients and their families and friends, the public, and health professionals. One toll-free number, 1-800-4-CANCER (1-800-422-6237), connects English- and Spanish-speaking callers all over the country with the office that serves their area. The number for callers with TTY equipment is 1-800-332-8615.

You may request the following NCI booklets by calling 1-800-4-CANCER:

ENGLISH

Understanding Prostate Changes: A Health Guide for All Men

Radiation Therapy and You: A Guide to Self-Help During Treatment

Get Relief From Cancer Pain

Managing Cancer Pain

Questions and Answers About Pain Control

Taking Part in Clinical Trials: What Cancer Patients Need To Know

What You Need To Know About Prostate Cancer

Eating Hints for Cancer Patients

Taking Time: Support for People With Cancer and the People Who Care About Them

Facing Forward: A Guide for Cancer Patients

When Cancer Recurs: Meeting the Challenge Again

Advanced Cancer

SPANISH

El tratamiento de radioterapia: Guía para el paciente durante el tratamiento (Radiation Therapy: A Guide for Patients During Treatment)

¿En qué consisten los estudios clínicos? Un folleto para los pacientes de cáncer (What Are Clinical Trials All About? A Guide for Cancer Patients)

**NATIONAL CANCER
INSTITUTE RESOURCES**
**CANCER INFORMATION
SERVICE (CIS)**

Provides accurate, up-to-date information on cancer to patients and their families, health professionals, and the general public. Information specialists translate the latest scientific information into understandable language and respond in English, Spanish, or on TTY equipment.
Toll-free: 1-800-4-CANCER
(1-800-422-6237)
TTY (for deaf and hard of hearing callers): 1-800-332-8615

INTERNET

<http://cancer.gov>

NCI's Web site contains comprehensive information about cancer causes and prevention, screening and diagnosis, treatment and survivorship; clinical trials; statistics; funding, training, and employment opportunities; and the Institute and its programs.

FAX

CancerFax®

Includes NCI information about cancer treatment, screening, prevention, genetics, and supportive care. To obtain a contents list, dial 1-800-624-2511 or 301-402-5874 from your touch tone phone or fax machine hand set and follow the recorded instructions.

**US TOO
INTERNATIONAL, INC.
WEB SITE**

Independent network of prostate cancer support groups that help newly diagnosed prostate cancer patients. The US TOO Web site is <http://www.ustoo.com>.

Glossary

ABCD rating: A staging system for prostate cancer. A and B refer to localized disease, C to regional disease, and D to cancer that has spread throughout the body.

Abdomen: The part of the body that contains the stomach, intestines, and other organs. The prostate is located in the lower part of the abdomen, also known as the pelvis.

Aggressive, aggressively: Rapidly growing when said of a tumor; an active intervention when said of a treatment such as surgery.

Ampullae: The enlarged lower sections of the two vas deferens.

Androgens: Male hormones, including testosterone.

Anesthetics: Drugs or gases that produce a loss of feeling or awareness. A local anesthetic causes loss of feeling in a part of the body. A general anesthetic puts a person to sleep.

Antiandrogen: A drug that blocks that activity of male hormones circulating in the blood.

Anus: The opening at the lower end of the rectum through which solid waste leaves the body.

Asymptomatic: Producing no symptoms.

Baseline level (PSA): The average of several PSA readings from blood samples taken from an asymptomatic man who is screened for prostate cancer.

Benign: Not cancerous.

Benign prostatic hyperplasia (BPH): Enlargement of the prostate. BPH is not cancer, but it can cause some of the same symptoms.

Biochemical relapse: The appearance of increased numbers of biochemical marker molecules such as PSA. May indicate cancer recurrence.

Biopsy: The removal of a sample of tissue, which is then examined under a microscope to check for cancerous changes.

Bladder: The organ where urine is stored.

Bone scan: A computer or film image showing abnormal areas of bone. A small amount of radioactive material (radionuclide), injected into the bloodstream, collects in the bones, especially areas of abnormality. The radioactivity it emits is detected by a machine called a scanner.

Bowel: The long, tube-shaped organ in the abdomen that completes the process of digestion. There are both small and large bowels. Also called the intestine.

Brachytherapy: See *Internal radiation therapy*.

Cancer: A term for diseases in which abnormal cells divide without control. Cancer cells have the potential to invade nearby tissues and to spread through the bloodstream and lymphatic system to other parts of the body.

Capsule: The tough outer covering of the prostate gland.

Cardiopulmonary: Related to the heart and lungs.

Cardiovascular problems: Health complications that involve the heart and blood vessels throughout the body.

Castration: Eliminating the supply of the male hormone, testosterone, either by surgery to remove the testicles or by hormonal drugs.

Catheter: A tube inserted into the body. One type of catheter can be inserted through the penis to allow urine to drain out.

Catheterization: The insertion of a tube through the penis into the bladder to allow urine to escape.

Chemotherapy: Treatment with anticancer drugs.

Clinical relapse: The appearance of symptoms of cancer's recurrence.

Clinical stage, staging: Exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body.

Clinical trials: Research studies that involve people. Each study is designed to answer scientific questions and to find better ways to prevent or treat cancer.

Clinically localized cancer (prostate): Cancer that is judged, on the basis of physical examination and other clinical evidence, to be contained within the prostate capsule.

Computed tomography (CT) scan: A series of detailed pictures of areas inside the body; the pictures are created by a computer linked to an x-ray machine. Also called computed axial tomography (CAT) scan.

Conformal radiation therapy (3D-CRT): Radiation treatment that uses sophisticated computer software to conform or shape the distribution of radiation beams to the 3-dimensional shape of the diseased prostate, sparing damage to normal tissue in the vicinity of treatment.

Cryo probe: An instrument filled with liquid nitrogen used to kill prostate cancer cells by freezing and thawing them quickly, so the cancer cells rupture.

Cryosurgery: A procedure that uses liquid nitrogen to freeze and kill abnormal cells.

Cystitis: Inflammation of the bladder, often marked by painful urination.

DFMO: Difluoromethylornithine, an inhibitor of an enzyme, ornithine decarboxylase (ODC). ODC is essential for the synthesis of polyamines, a class of compounds that play central roles in the growth of cancerous tissues.

Diagnosis: Identifying a disease first by its signs and symptoms and then confirming by a pathologic examination of biopsy tissue samples or other tests.

Differentiated (well-, moderately, or poorly): A description of how healthy and normal a cell or tissue looks under the microscope. Well-differentiated cells appear mature, similar to one another, and orderly. Poorly differentiated cells are irregular and misshapen. See *Grade*.

Digital rectal exam (DRE): A procedure in which the doctor inserts a gloved finger into the rectum to examine the rectum and prostate.

Disease-specific survival rate: A measure of the proportion of people who die from the specific disease being studied, excluding deaths from other causes.

DNA: The protein that carries genetic information. Every cell contains a strand of DNA.

DNA repeats: Multiple identical stretches of genetic material.

Early hormonal therapy: See *Neoadjuvant hormonal therapy*.

Ejaculation: The release of semen through the penis during sexual climax. In dry (retrograde) ejaculation, semen spurts backward into the bladder rather than out through the penis.

Environmental carcinogens: Chemicals that can cause cancer in a person who is exposed to a significant level of contamination.

Enzyme: A natural substance that affects the rate at which chemical changes take place in the body.

Erection: Swelling and hardening of the penis in response to sexual excitement.

Estrogen: A female hormone. Estrogens are sometimes used in the treatment of prostate cancer to block the release and activity of testosterone.

External beam radiation therapy: Radiation treatment delivered from a machine. See *Radiation therapy*.

Fecal incontinence: The loss of normal control of the bowels. This leads to stool leaking from the rectum (the last part of the large intestine) at unexpected times.

Fiberoptic probe: A flexible, lighted tube that a doctor can use to examine areas inside the body.

General anesthetic: See *Anesthetics*.

Genes: The basic biological units of heredity, found in all cells in the body.

Genetic: Pertaining to genes and their heredity.

Gland: An organ that produces and releases one or more substances for use by various parts of the body.

Gleason grade: A number from 1 to 5 indicating how different a sample of prostate tissue looks when compared to normal prostate tissue.

Gleason grading system: A method widely used to characterize prostate tumors. Low Gleason grades and scores indicate slow-growing cancer. High grades and scores indicate a cancer likely to grow aggressively and spread outside the capsule.

Gleason score: A number from 2 to 10, obtained by adding the Gleason grades from the two most abnormal areas in the prostate tissue being examined.

Grade: A measure of how closely a cancer resembles normal tissue, that is, how well it is differentiated. Tumor grade suggests the tumor's likely rate of growth. See *Gleason score*, *ABCD rating*.

Hormonal-type drugs, therapy: Treatment that prevents certain cancer cells from getting the hormones they need to keep growing. For prostate cancer, the supply of male hormones can be blocked either with hormonal drugs or by surgery to remove the testicles.

Hormone-responsive: Cancer that responds to hormone treatment.

Hormones: Body chemicals that are secreted by glands, circulate in the bloodstream, and produce specific effects on target organs and tissues.

4-HPR: A vitamin A analog that may block hormone-responsive tumors.

Image, imaging techniques: Methods for obtaining pictures of organs and tissues inside the body. Common imaging techniques include x-ray, ultrasound, CT scans, MRI, and bone scans.

Immune system: The complex set of cells and organs that defends the body against infection and disease.

Impotence (sexual): Inability to achieve an erection sufficient for sexual intercourse.

Incidence (rate): The number of cases diagnosed per 100,000 persons in the population.

Incision: A cut made in the body during surgery.

Incontinence (urinary): Loss of urinary control.

Indolent: Slow-growing.

Internal radiation therapy: The use of tiny radioactive seeds—or implants placed directly into or next to the prostate gland—to kill cancerous cells. This is also known as interstitial implantation or brachytherapy.

Interstitial implantation: See *Internal radiation therapy*.

Invasive (procedure): “Invading” the body’s barriers, typically by cutting or puncturing the skin or by inserting instruments into the body.

Laparoscopy: A surgical procedure in which a thin lighted tube is inserted through a small incision in the abdomen, allowing the doctor to see inside the abdomen. Pelvic lymph node dissection can be performed via laparoscopy.

Latent: Present but inactive, producing no symptoms.

Localized prostate cancer: Cancer that is confined to the prostate gland (identified as Stage I or Stage II).

Lymph: An almost colorless fluid that travels through the lymphatic system and carries cells and substances that help fight infection and disease.

Lymph nodes: Small, bean-shaped organs that are part of the body’s immune defense system. Lymph nodes are located throughout the body along the channels of the lymphatic system. Lymph nodes are also called lymph glands.

Lymphatic system: The tissues and organs (including bone marrow, spleen, and lymph nodes) that produce and store cells and substances that fight infection and disease. These organs are connected by a body-wide system of channels, similar to blood vessels, that carry lymph, an almost colorless fluid, and the infection-fighting cells it contains.

Magnetic Resonance Imaging (MRI): A procedure in which a magnet linked to a computer is used to create detailed pictures of areas inside the body.

Malignant: Cancerous.

Maximum androgen blockade:

Treatment to totally block the production of male hormones. Androgen suppression is achieved by surgical removal of the testicles, by taking female sex hormones, or by taking other hormonal-type drugs.

Medical castration: The use of drugs to cut off supplies of male hormones.

Metastasis, metastases, metastasized: The spread of cancer cells from one part of the body to another by way of the bloodstream or the lymphatic system. The cells in a metastatic tumor are the same kind of cells as those in the original (primary) tumor.

Metastatic prostate cancer: Cancer that has spread (Stage IV) to the lymph nodes of the pelvis or to more distant parts of the body.

Microscopic: Something so small that it can be seen only when magnified by a microscope.

Neoadjuvant hormonal therapy:

Drug therapy administered prior to surgery or radiation, in hopes of shrinking the tumor to make it easier to remove or destroy. Also known as early hormonal therapy.

Nerve-sparing surgery: A surgical technique that carefully avoids cutting or stretching two bundles of nerves and blood vessels that run closely along the surface of the prostate gland and that are needed for an erection.

Nonpalpable: Cannot be felt (palpated).

Observation: See *Watchful waiting*.

Oncologist: A doctor who specializes in diagnosing and treating cancer.

Orchiectomy: Surgery to remove the testicles.

Orgasm: Sexual climax.

Palliative treatment: Therapy that relieves symptoms such as pain or blockage of urine flow, but is not expected to cure the cancer. Its main purpose is to improve the patient's quality of life.

Palpable: Can be felt (palpated).

Pathologic staging: Microscopic evaluation of tissues removed at biopsy or surgery.

Pathologically localized prostate cancer: Cancer that is diagnosed by microscopically examining a prostate gland removed at surgery.

Pathologist: A doctor who specializes in identifying diseases through the cell and tissue changes the diseases produce.

Pattern biopsy: A biopsy taking samples of tissue from half a dozen or more carefully spaced sections of the prostate gland.

PCPT (Prostate Cancer Prevention Trial): A study in which healthy men are taking either the drug finasteride or a placebo every day for 7 to 10 years to see if the drug helps to prevent prostate cancer.

Pelvic lymph node dissection: Removal of lymph nodes near the prostate to determine if cancer has spread.

Pelvis: The lower part of the abdomen, located between the hip bones.

Penis: The external male organ of urination and reproduction.

Perineal prostatectomy: See *Radical prostatectomy*.

Perineum: The space between the scrotum and the anus.

PIVOT (Prostate Cancer Intervention versus Observation Trial): A 15-year study to see if men with localized prostate cancer who are assigned to watchful waiting do as well as men treated with surgery.

Placebo: An inactive look-alike drug (or other intervention). Placebos may be used in clinical trials evaluating the effectiveness of a new drug or other treatment.

Pretreatment PSA levels: PSA readings from blood samples taken from a man who is clinically and/or pathologically diagnosed with prostate cancer, but who has not yet received treatment.

Proctitis: Inflammation of the rectum, often marked by pain, diarrhea, and bleeding.

Prognosis: The probable outcome or course of a disease; the chances of complete recovery or recurrence.

Prostate enlargement: See *Benign prostatic hyperplasia*.

Prostate gland: A male sex gland. The prostate produces fluid that forms part of the semen.

Prostatectomy: Surgery to remove the prostate. See *Radical prostatectomy*.

Prostatitis: Inflammation of the prostate gland.

Prosthesis, prostheses: An artificial replacement part. It is possible to replace the testicles with prostheses.

PSA (Prostate-specific antigen): A protein produced by cells of the prostate gland. PSA circulates in the blood and can be measured with a simple blood test. PSA levels go up in the blood of some men who have prostate enlargement or prostate cancer.

PSA density: A measure relating a man's PSA level with the size of his prostate.

PSA level: Concentration of prostate-specific antigen circulating in a man's blood.

PSA test: A test that measures the PSA level in a sample of blood. PSA levels can be useful in detecting prostate cancer, in staging prostate cancer, and in monitoring response to treatment.

PSA velocity: A measure indicating how rapidly a PSA level rises over time.

Radiation: Energy carried by waves or by streams of particles. Various forms of radiation, including x-rays, can be used in low doses to diagnose disease and in high doses to treat disease.

Radiation oncologist: A doctor who specializes in using radiation to treat cancer.

Radiation therapy: The use of high-energy rays, such as x-rays, to kill cancer cells. The rays can be either beamed from a machine (external) or emitted by radioactive seeds implanted in the tumor (internal). See *Internal radiation therapy* and *External beam radiation therapy*.

Radical prostatectomy: Surgery to remove the entire prostate gland along with nearby tissues such as the seminal vesicles. Radical prostatectomy can be performed either through an incision in the lower abdomen (*retropubic prostatectomy*) or in the space between the scrotum and the anus (the perineum) (*perineal prostatectomy*).

Radioactive: Giving off radiation.

Radioactive iodine: An isotope of iodine, which means that it is chemically similar to iodine but unstable, giving off energy over several weeks as it decomposes.

Radioactive palladium: An isotope that is unstable and gives off energy over several weeks as it decomposes.

Radioactive seeds: Small, radioactive, chemically unstable particles that are delivered precisely to cancer cells to kill them using the energy given off as the particles decompose.

Radionuclides: Radioactive chemicals. Radionuclides are used in making bone scans.

Rectum: The lower part of the large intestine. The rectum stores solid waste until it leaves the body through the anus.

Recurrence, relapse: The reappearance of cancer after treatment has been completed.

Regional (pelvic) lymph nodes: For the prostate, lymph nodes in the pelvic area.

Regional prostate cancer: Cancer that has spread through the prostate capsule, perhaps into the seminal vesicles, but not yet into nearby lymph nodes or beyond (identified as Stage III).

Remission: Disappearance of the signs and symptoms of cancer. When this happens, the disease is said to be “in remission.” Remission can be temporary or permanent.

Retropubic prostatectomy: See *Radical prostatectomy*.

Scrotum: The pouch of skin that contains the testicles.

Seeds: See *Radioactive seeds*.

Semen: The thick, whitish fluid released through the penis during orgasm. Semen is made up of substances produced by the prostate, the seminal vesicles, and other male sex glands, and contains sperm that come from the testicles.

Seminal vesicles: A pair of pouch-like glands, adjacent to the prostate, that contribute substances to the semen.

Side effects: Unavoidable results that may accompany treatment. The potential side effects of prostate cancer treatment include incontinence and impotence.

Signs: Effects of disease that can be observed and/or measured. An elevated PSA level may be a sign of prostate cancer. See *Symptoms*.

Sperm: Male reproductive cells, produced in the testicles.

Sphincter: A band of muscle fibers that can relax or tighten to open or close a bodily opening or passage.

Stage: The extent of a cancer. Clinical and pathological evidence are used to determine stage.

Staging: Doing tests to establish the extent of a cancer, especially whether it has spread beyond its original site to other parts of the body. See *TNM rating* and *ABCD rating*.

Stool incontinence: See *Fecal incontinence*.

Support group: An association of people whose shared experiences allow them to offer one another advice and encouragement.

Surgery: An operation.

Surgical margins: The outermost cut edges of tissue that has been surgically removed.

Surveillance: See *Watchful waiting*.

Symptoms: Effects of disease as experienced by the patient and/or found by a health professional during a physical examination. Pain, for example, is a symptom. See *Signs*.

Testicles: The pair of egg-shaped glands, contained in the pouch-like scrotum, that produce sperm and male hormones. The testicles are also called the testes.

Testosterone: A male sex hormone, produced primarily by the testicles. Testosterone plays an important role in a man's sexuality. It also fuels the growth of prostate cancer.

TNM rating: A cancer staging system that evaluates Tumor size and extent of the primary tumor, cancer in the nearby lymph Nodes, and Metastases.

TRUS (Transrectal Ultrasound):

The use of sound waves to image the prostate. The sound waves are emitted by an instrument inserted into the rectum. As the waves bounce off the prostate, they create a pattern that is converted by a computer into a picture. TRUS is used to detect abnormal prostate growth and to guide a biopsy of the abnormal prostate area.

Tumor: An abnormal growth of tissue. Tumors can be either benign (non-cancerous) or malignant (cancerous).

TURP (Transurethral Resection of the Prostate): Surgery for benign prostatic hyperplasia. Performed with instruments inserted through the penis, TURP cuts away excess prostate tissue.

Ultrasound: An imaging technique that uses sound waves to produce pictures (sonograms) of body tissues. See *TRUS*.

Ureters: The pair of tubes that carry urine from the kidneys to the bladder.

Urethra (male): In males, a tube extending from the bladder to the tip of the penis. It carries urine from the bladder and, during ejaculation, semen from the prostate gland, out through the penis.

Urinary system: The bodily system that controls urination, which discharges fluids and waste products from the bladder.

Urine: The fluid containing water and waste products that is stored in the bladder and discharged through the urethra.

Urologist: A doctor who specializes in disorders of the urinary system and the male reproductive system.

Vas deferens: A pair of tubes that carry sperm from the testicles to the prostate gland.

Vitamin A analog: A substance similar in chemical structure to Vitamin A.

Watchful waiting: Forgoing aggressive therapies unless symptoms or other signs of disease progress. Watchful waiting with frequent monitoring may be a treatment option for both benign prostatic hyperplasia and early-stage prostate cancer. Also known as observation or surveillance.

Well-differentiated: See *Differentiated*.

X-ray: A high-energy form of radiation. X-rays form an image of body structures by traveling through the body and striking a sheet of film.

The National Cancer Act, passed by Congress in 1971, made research a national priority. Since that time, the National Cancer Institute (NCI), the lead Federal agency for cancer research, has collaborated with top researchers and facilities across the country to conduct innovative research leading to progress in cancer prevention, detection, diagnosis, and treatment. These efforts have resulted in a decrease in the overall cancer death rate, and have helped improve and extend the lives of millions of Americans.

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